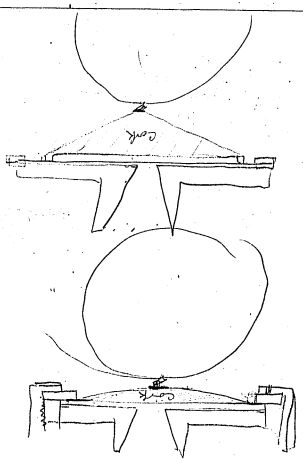
Notebook, N-99-01-05

This notebook was used by Edison during January 1899. Most of the book contains notes and drawings regarding improvements in cylinder phonograph recording and reproduction. There are also notes pertaining to iron ore milling and to cement. Near the end of the book are production estimates for a proposed cement plant and the draft of a speech given by telephone to the Massachusetts Institute of Technology. The pages are unnumbered, and several pages have been removed from the book. Approximately 180 pages have been used.



bb / 5

Reducing agts

Nitrites —

Hot solution of purpurin on KOH discovers phosphorus without Evolution of H, Orcin Reduces

Sulphuretted hydrogen water — Phosphorus dissolved in oil —
Barium Hydrate

Zinc dust in Nitride KOH-water.

permanganate K for oxidation —
Oxalic acid

Selenide K Nitrous Ether

" Hydrogen
Sodium amalgam —

Tellunde K. Olivif
Cadmium Sulphide Benzyl
" Ferrous Acetate, Nitrogen Sulphate Reduces

Sulfocyanide Phenyl- Picric (Ac.)
Reds

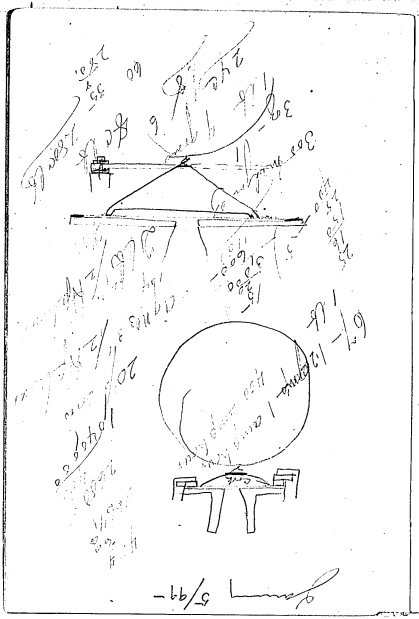
Oxychloride Phosphorous

oxdsyl Hypochlorite Sodium

Ferricyanide K pyrocatechin in oxygenates

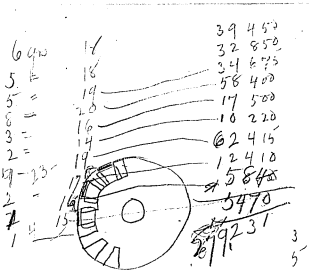
Nitrite of Amyl

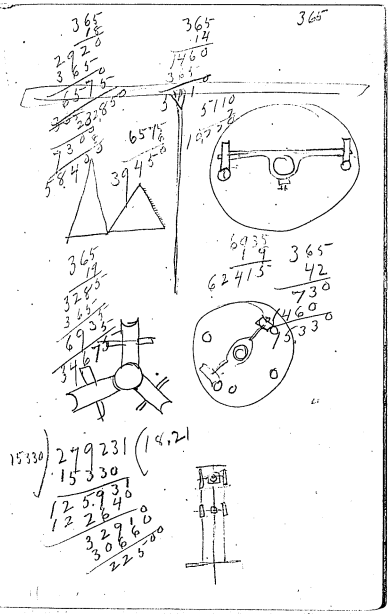
50-10-66-N

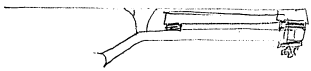


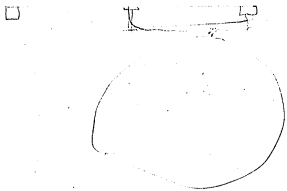
Persulphocyanic acid —
Persulphocyanogen —
Phenol

Picric ppd Cu salts
Phenyl sulphohydride or
Phenyl-Mercaptan
Phosphorous Selenide









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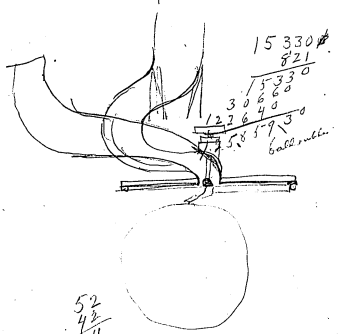
5.3
100.3

12585 days
2184
10401
10080
3217
3120
97
47.3
312

Jan 5/99
18.21 hours

12585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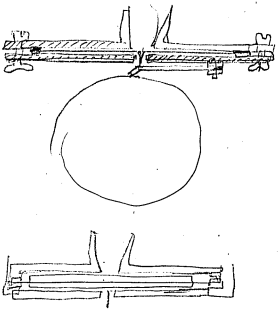
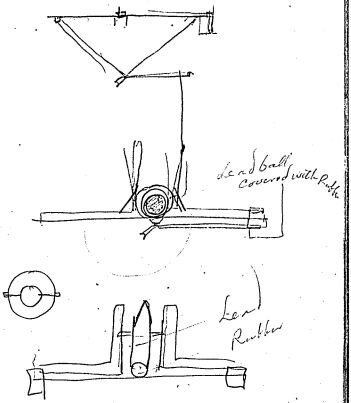
Jan 15/99



Jan 5/99



January 5, 99.

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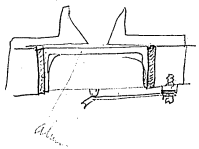
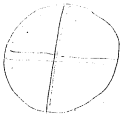
6ft
4 tons/sqm
25 tn
75 kn.
16 to 20 mm.
40 mm.
20 mm.
20 mm
1400
4000

Jan 5 99





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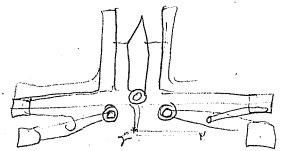

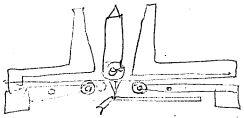

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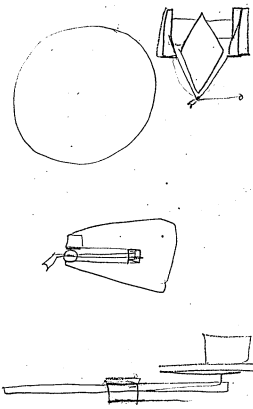

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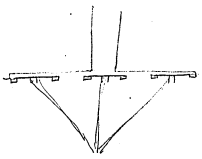

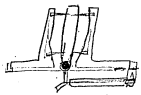

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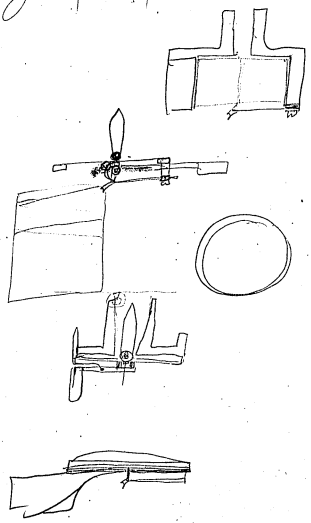

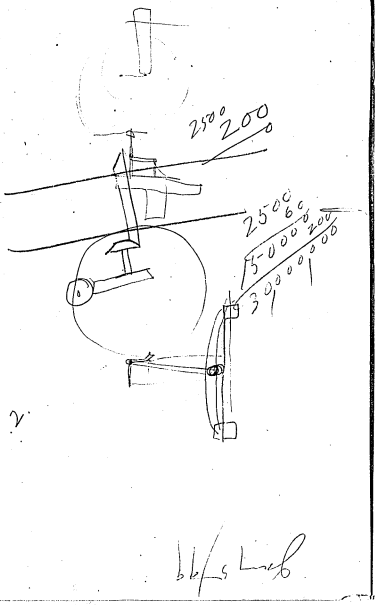
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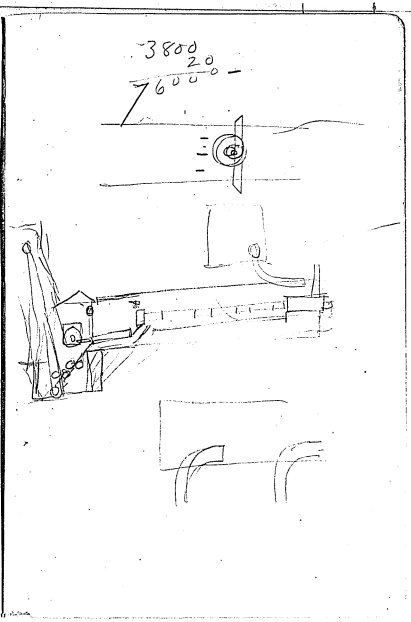
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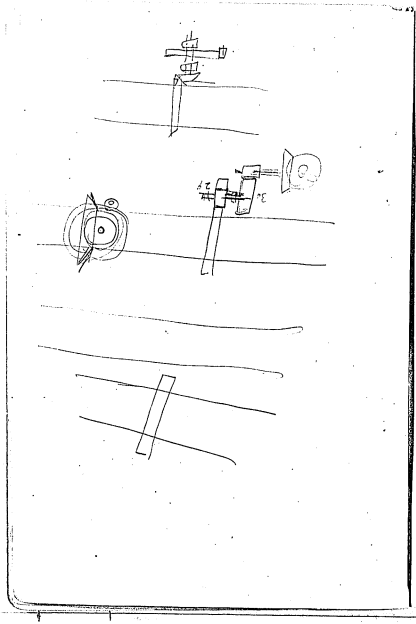

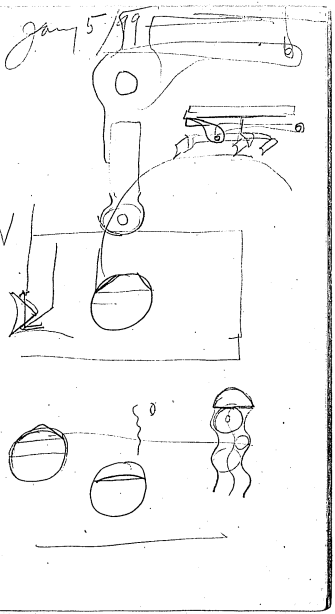
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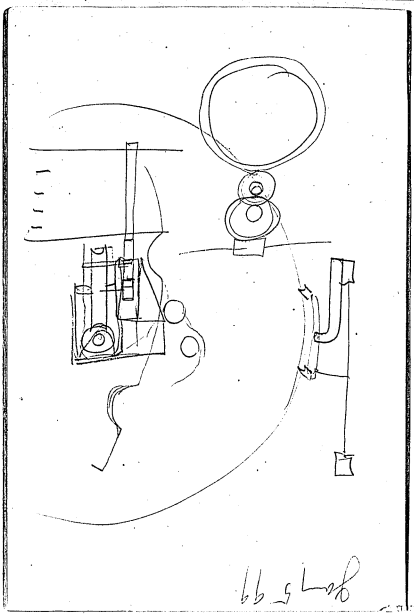

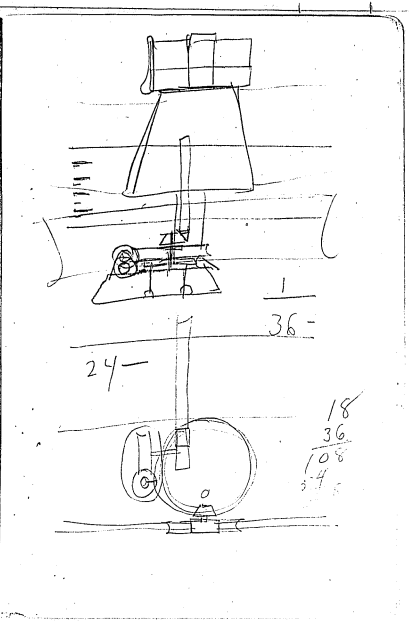
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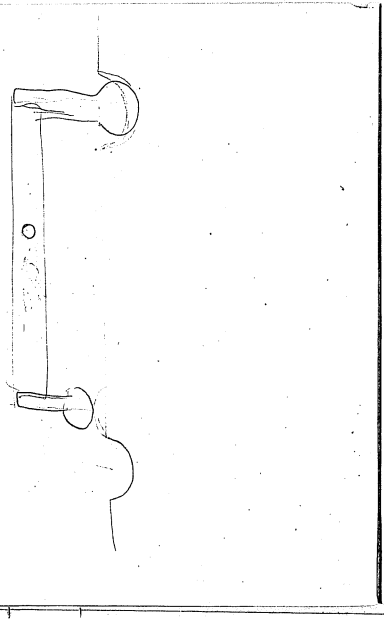
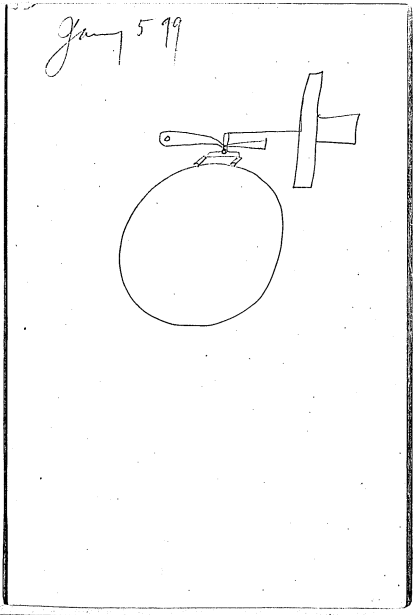
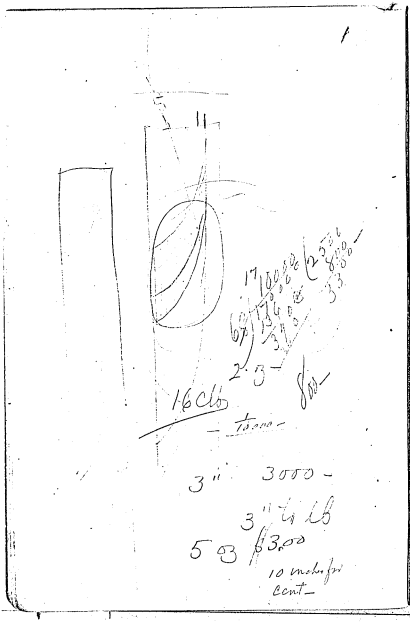
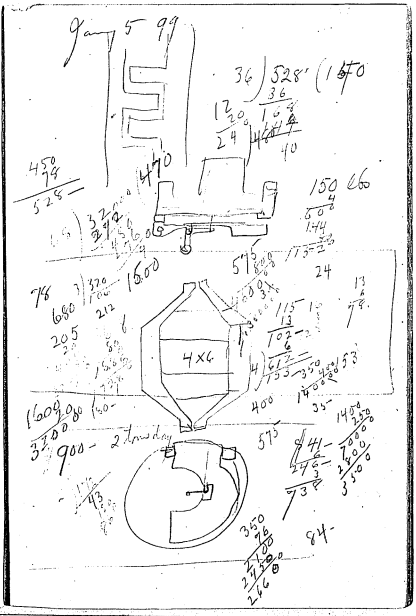
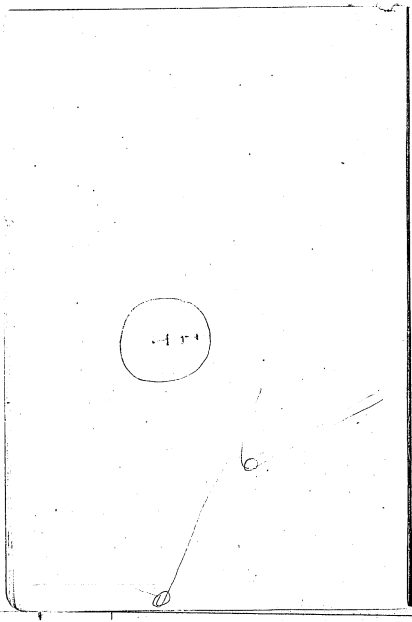
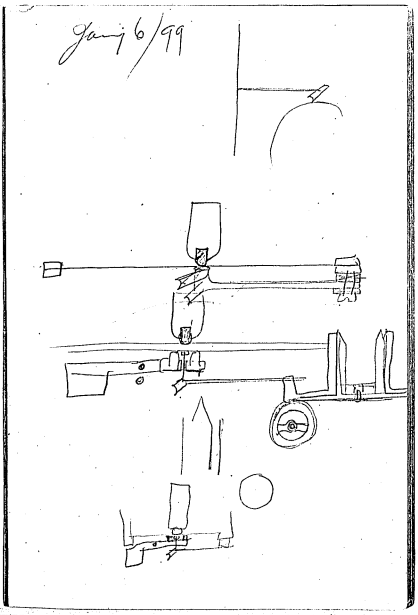


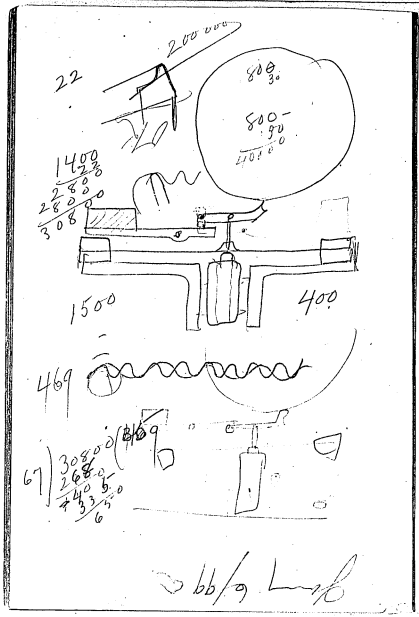

Jan 5 99


16 Cl
3"
3000 -
3" ¼ LB
10 mahogfor
cent


4x6
2 drawbag



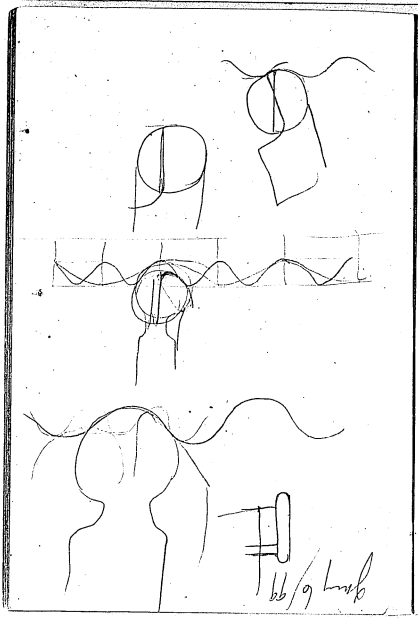

Jan 6/99



Savery Mill 1 CP–
Cannon foreman Mill 1
McGuire " CP–
Harry Bkg plant,
Balandin – magnetic, assay coal + ovens
~~Wood shop helper~~
Coal foreman mine shop
Wood Master Mech
Bob – Mine –
Dan Smith, Mine foreman –

3 Hughes speed = 9
4915 a set
Mine Elev
6 Elec Belt Elev –
Fan in 5th Hdrs –
New mine shop
fly wheels – 6 cal ovens
Tipples 95 + 6
mine mach house new mach
friction grant
new cabs 1st 36
Braun Corp – slow speed
Spike No 3 Gauge
new wheels, shop
Sand th with vacuum
Heating system + fix oil ovens
grade Ally fix 445 with 1 ft fill
Master drop Sound house

New Eng 6 kw –	4000
New foundry	800
	2000
	4000
	1000
	800
	4800
	1000
	1000
	600
	800
	500
	250
	800
	400
	800
	1000
	3000
	2000



Cable-Machine

38
6.0
228.

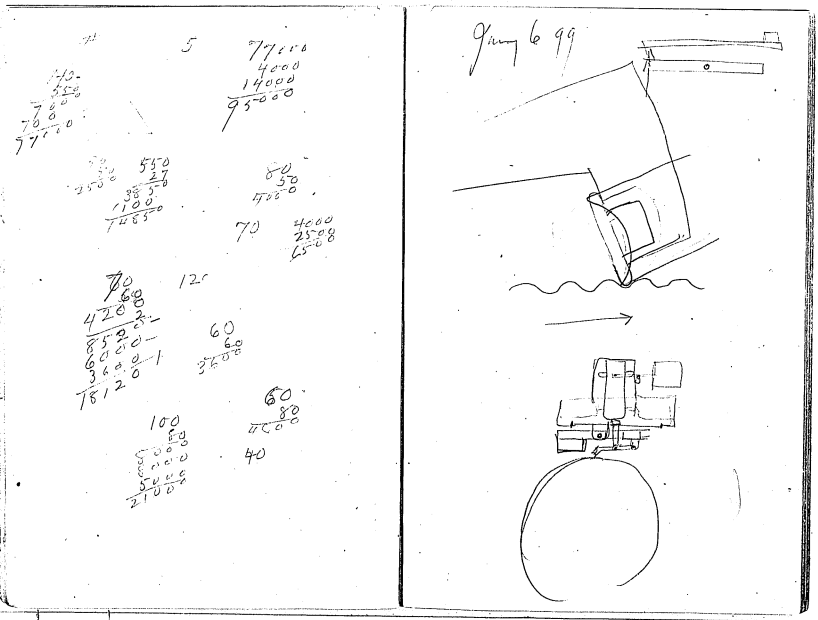
2000 | 100
76.00 | 18
6.00
1600.00

18 - 22

22 | 6.000
3.000

1728 | 32.00
12096
1904
1036
67 20

(7.64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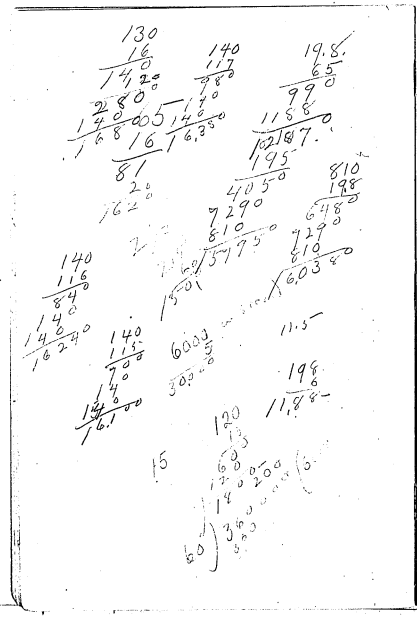
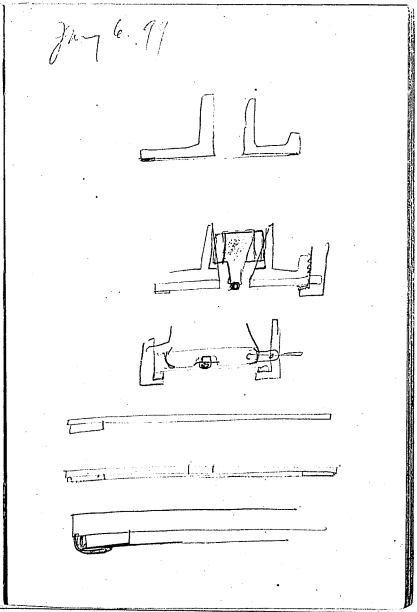
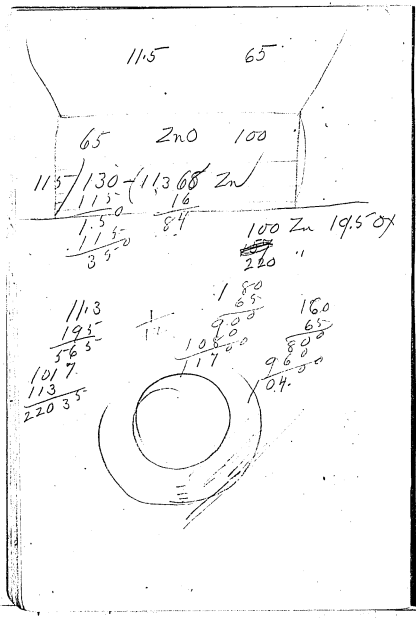
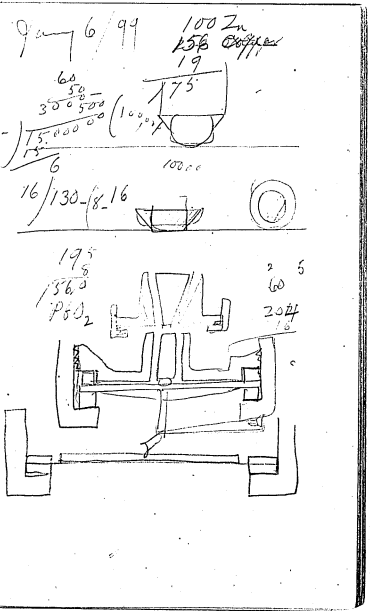
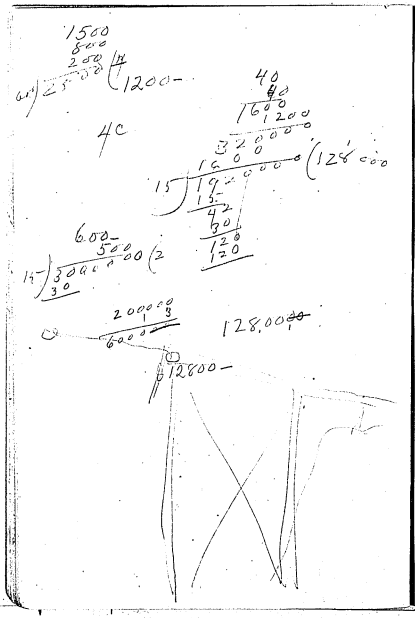
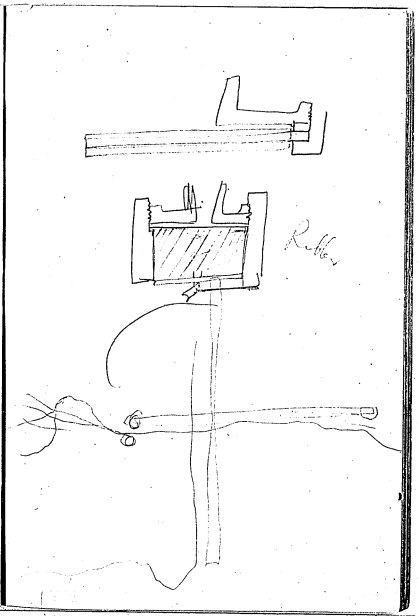


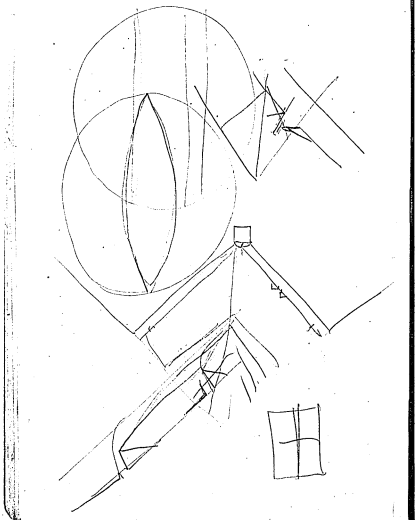

Jan 6. 91


11.5
65
65 ZnO 100
11.5 / 130 - (11.368 Zn
1.5
1.15
.35
16
.84
100 Zn 19.50
220
11.3
19.5
56.5
10.17
11.3
22.035
1.80
65
90.00
108.00
11.7
16.0
65
80.00
96.00
10.4

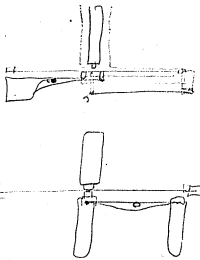

9 - 6 / 99
100 Zn
19
175
15 / 15.000 (100.00
6
100.00
16 / 130 - 18 - 16
19.5
136.5
60
204
10

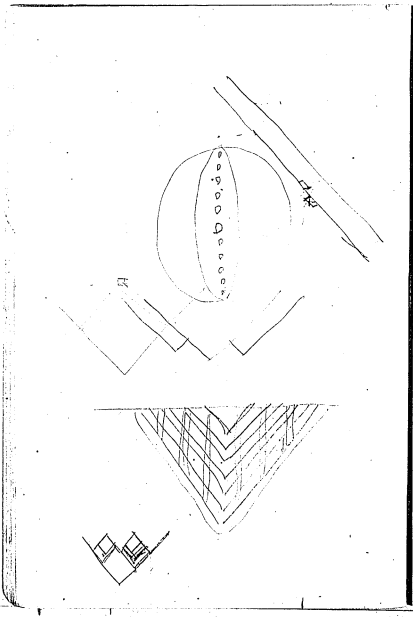

1500
5000
2500
1200-
40
1600
16,200
32000
16000
128000
4c
15
6.00-
5.00
128.00
12800-

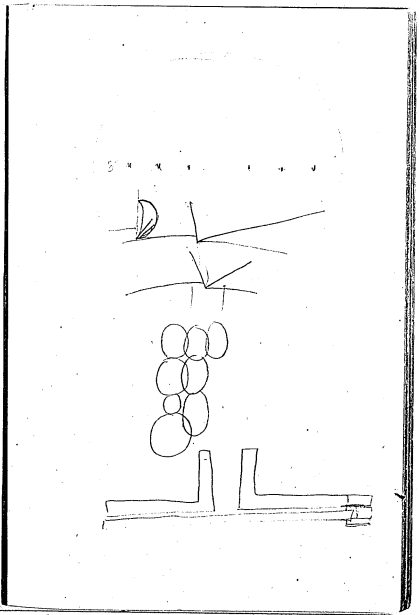

Rubber



Jan 7/99







60% —

615
234
849

2240 | 60
1344 | 37.4
458
420
380
360
20

72.4 | 5 3 3 6 | 8.30
61 3 5 5 2
57 9 2 5
3 6 3 5
3 6 2 0
15 2

7

27 | 55 | 31 | 14
85 0
75
10
3775
22640
15
2341

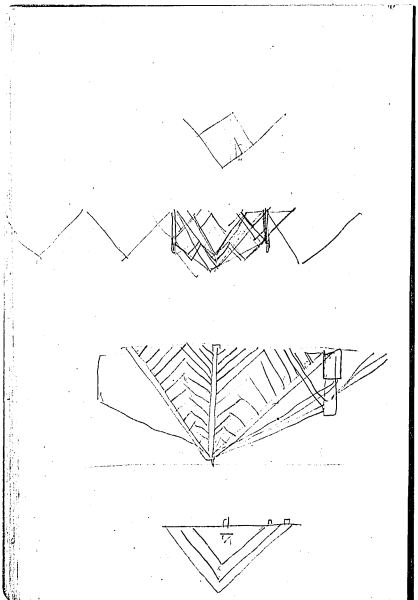
60% — 849 lbs glacial —
615 " Anhydrite

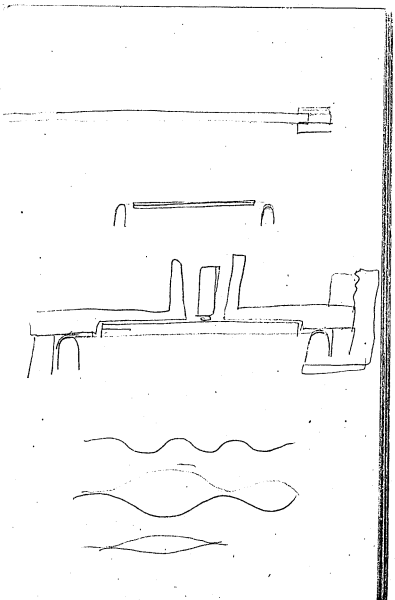
Lixiviation. Bal 15% glacial
10% anhy

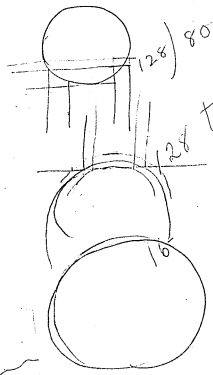
average of bauxite
as all lower than 5-B
but below next charge

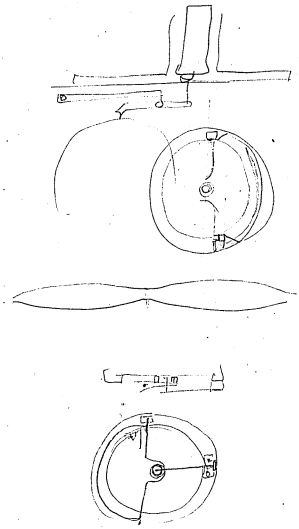
12% of mixed lots on
Fluoride Co — of Carbo Cast Mg

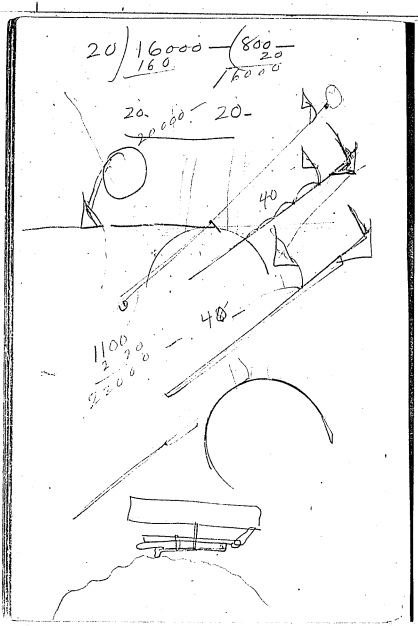
a 60% will require
~~2100 lbs~~ 50 Bauxite
107 lbs for every 101 lbs Blue





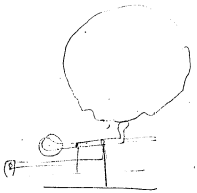

80/round knife-
128/80000 1/6
128 to 1
3
16

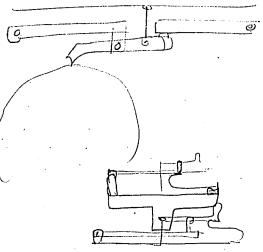


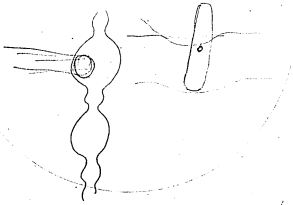


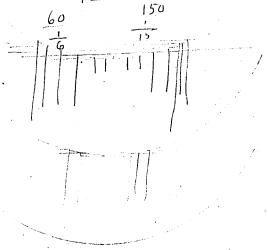
Your worthy President has asked me to say a few words this Evening over the telephone.

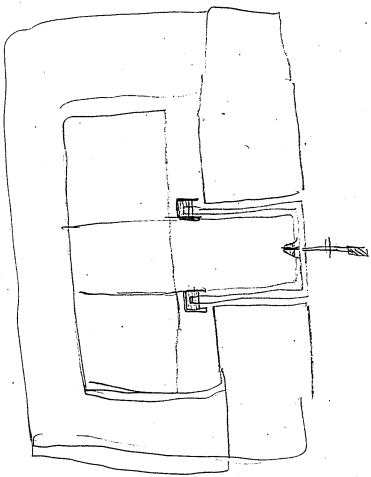
~~I~~ There is one gift that I envy more than any which has always been a matter of wonder to me and that is the Capability of making an after dinner speech. I have tried it once or twice & the result is that I start off trembling like a leaf & forget everything I intended to say and

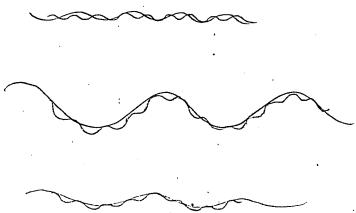







120
1/12
60
1/6
150
1/12





Jan 7 99

1 Very soft wax gives large indentations but the hissing sounds or overtones are reproduced loud sounds dull- not large Volume + great disparity between fundamentals & overtones-

2nd As you use a harder wax you do not get such large indentations, the hissing sounds come out clear + the whole Volume is louder

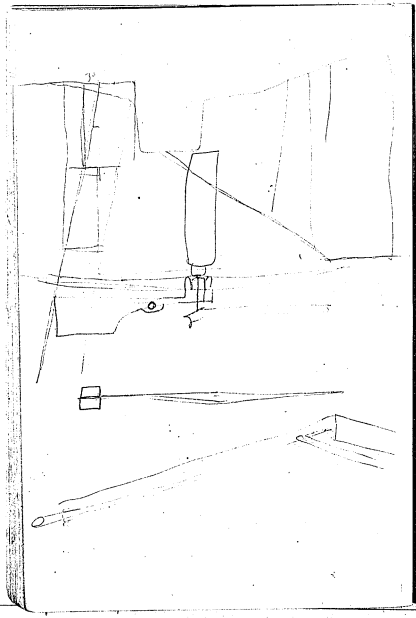
3rd When you get an exceedingly hard cylinder the aspirates are abnormally loud Talking is loud + extremely clear while indentations are faint

not occupy 1/3rd of the 12 grooves but in proportion to modulation the Volume is great, Music is not recorded well, because it is too hard to give any depth of fundamentals while for slight depths the aspendix do the work easily but the power required as depth increases is very great—

4th = With Regular Way some cylinders showing record apparently of great amplitude gives poor volume while some showing apparently shallow undulations give great volume—

5th Tin quite record which does not occupy over 2/1000 of the 10/1000 yet can be heard all over the room from a funnel -

6 It is evident that when the diaphm is vibrating with great amplitude that the weaker waves have not enough control of it to check or accelerate it so as to impress themselves on it the stored up power of momentum of the mechanism gets beyond the power of the air chamber Condensations + rarefactions to Control, Hence it is necessary to limit or reduce the amplitudes to small limits in such a way that it will not be done by



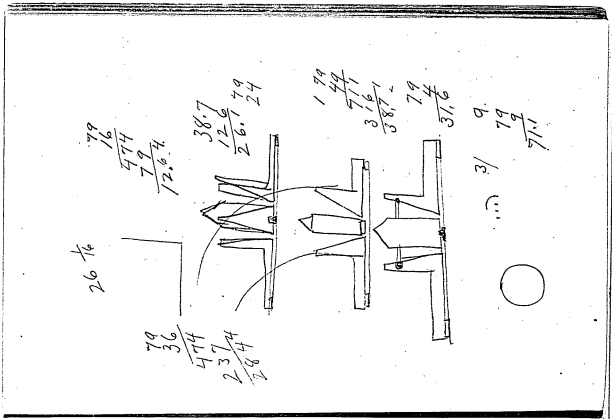
increasing the weight or rigidity of the parts, so work is done within the mechanism — The mechanism should be very sensitive + yet its amplitude must be checked

15 | 30 60 90 | 120,000

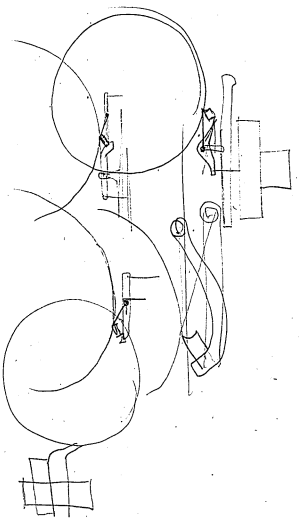
120

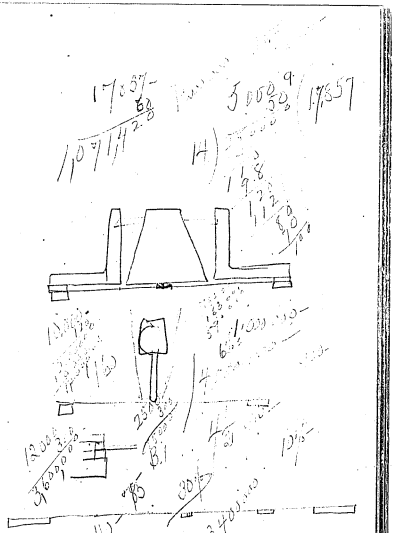
120 days

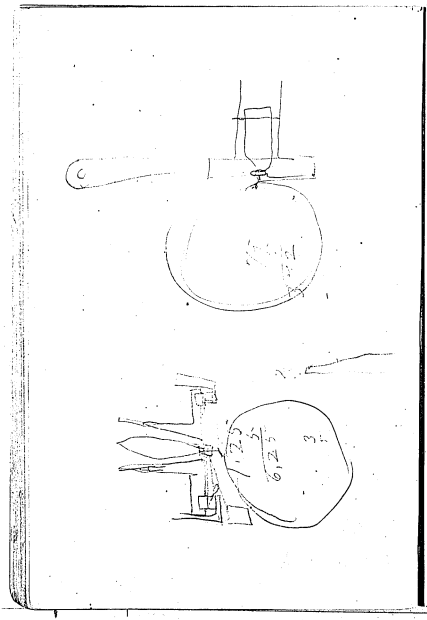
120 / 360 = 1 yr

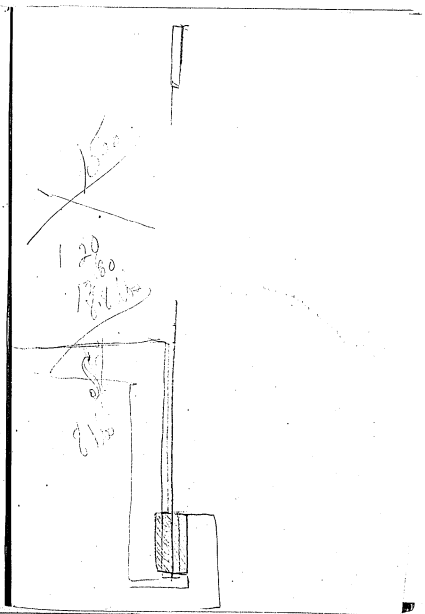


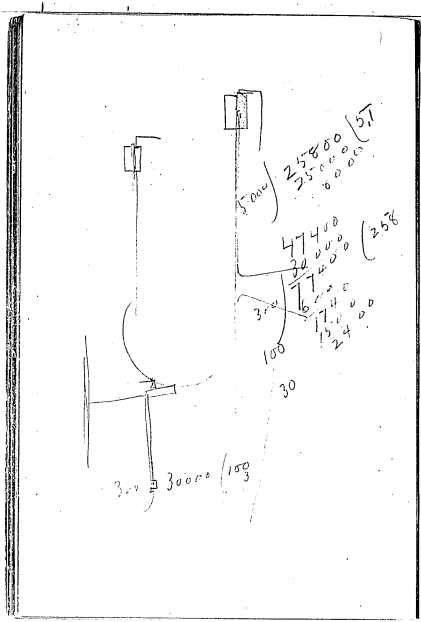
2 dia – 1/4 circles. hence Reeds 7/8 long
1/8 at one end 15/1000 set other to bend
one 1/1000 of inch certainly requires 10 milgrms
48 Reeds 480 milgrms – 4 1/2 / 1000 thick
Question of weight of idea of solid –
If 2 1/4 / 1000 used + bending load was to represent
depth – then it will only require 240 milgrms
which is saved entirely outside of metal,
which is chasing sharpening the sound.



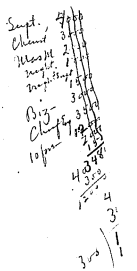


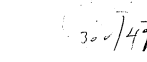


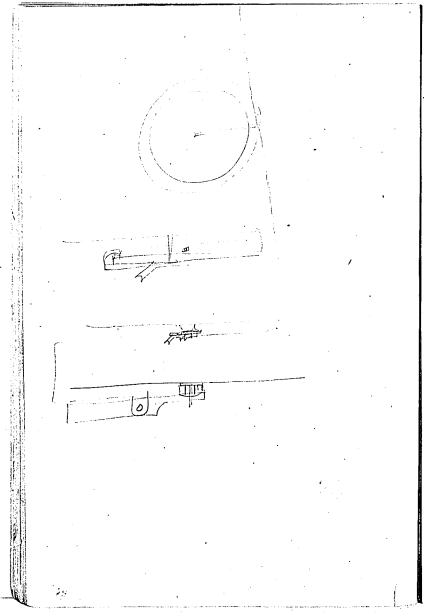


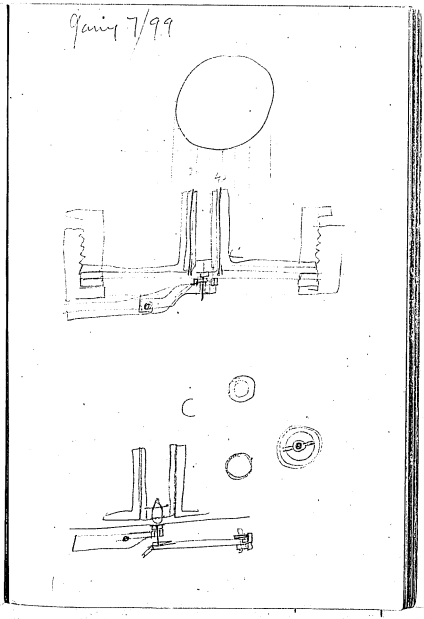


Supt mine =	8	2500
Chemist =	10	3000
Master Mechanic	15	4500
night m m	8	2500
Supt.	15	4500
night Supt	8	2500
Business manager	15	4500
Chief Engr	12	3600
5 foremen	5 (each)	15000
5 " night	5 "	3000
Electrician	10 "	
Fuel	6 "	





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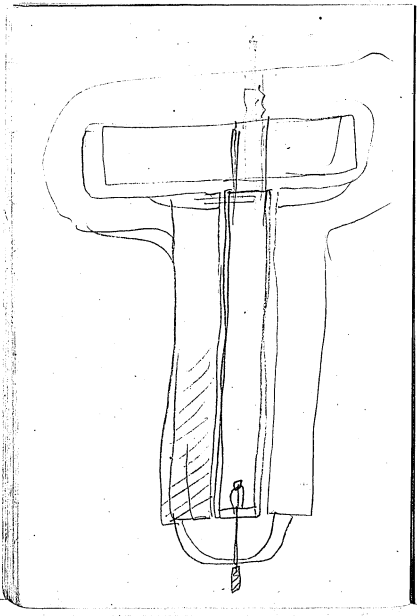
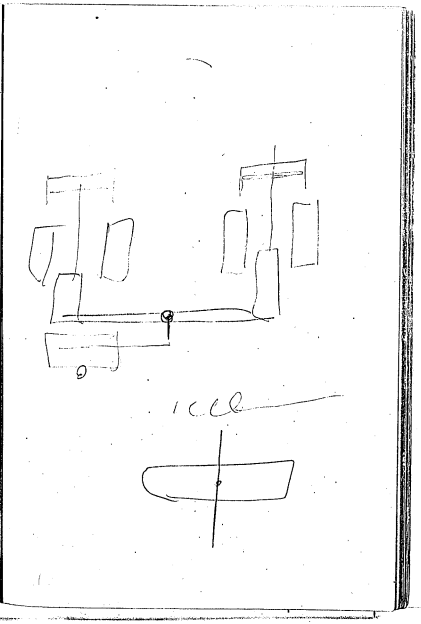
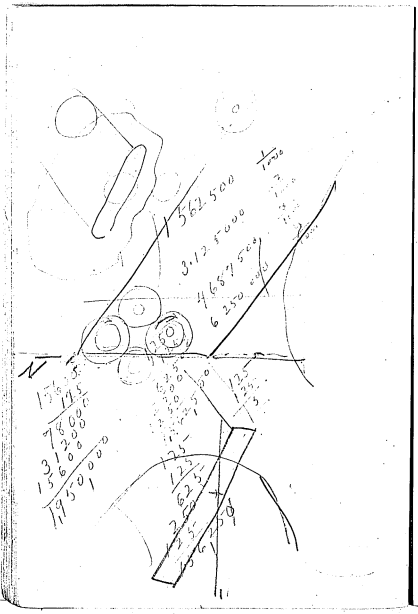
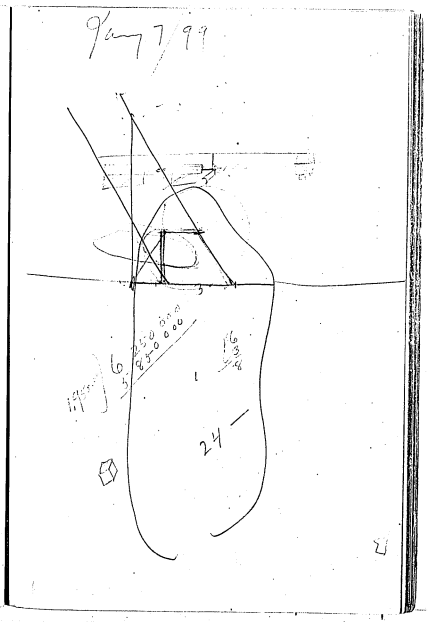



ICCE

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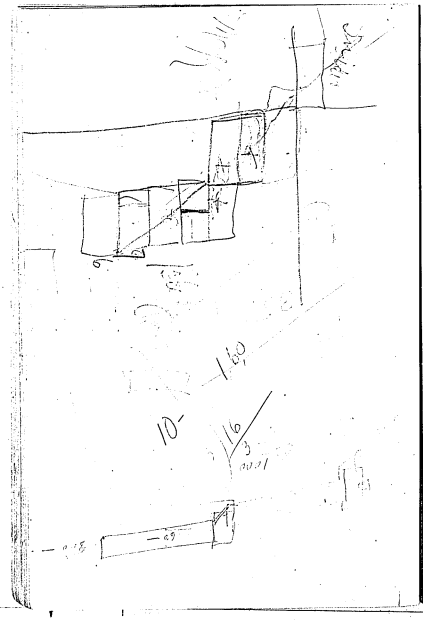
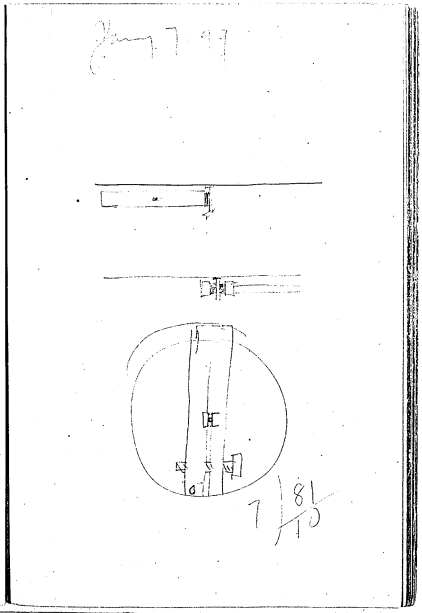
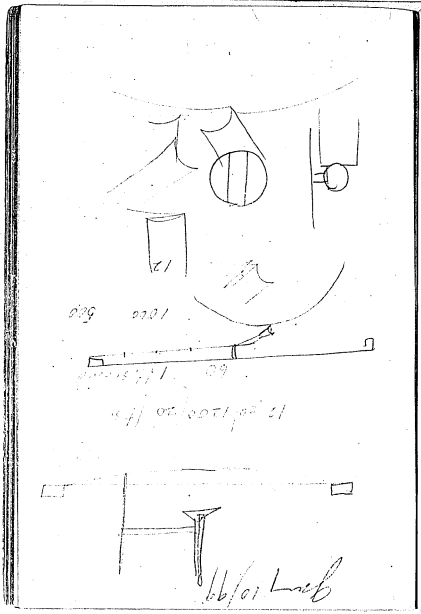




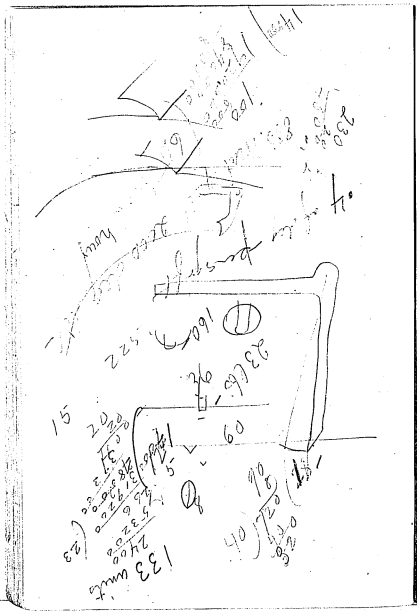


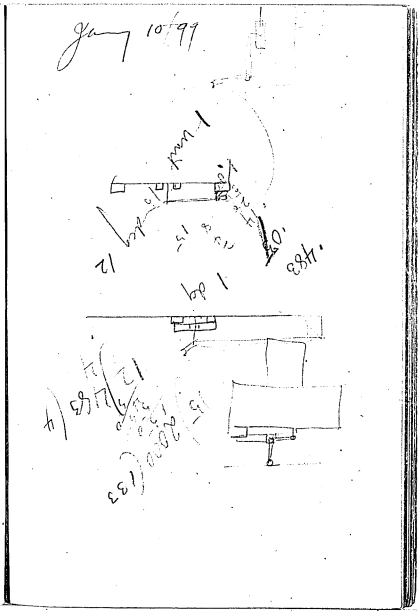
30,000.

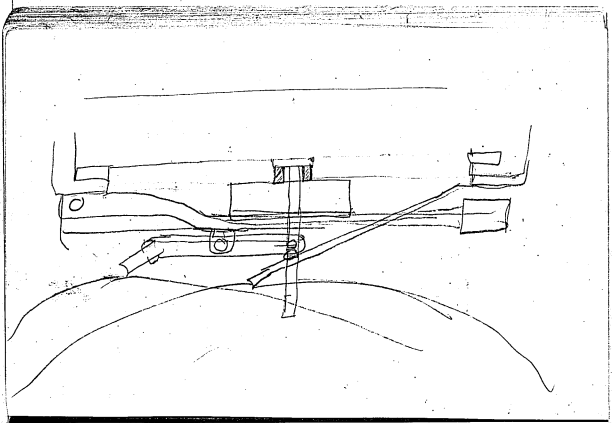
Septmin

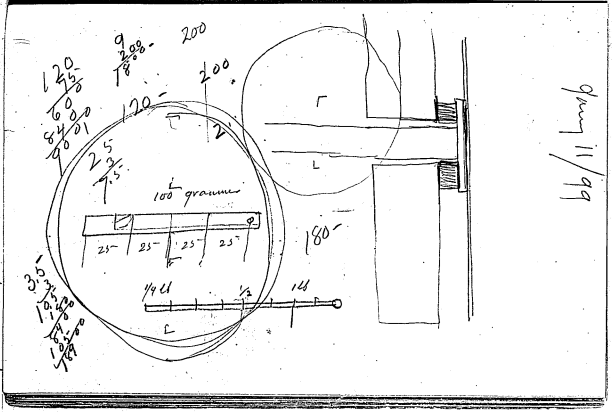
50	5	25.00	7.500
45	7.5	37.50	11.250
40	10	50.00	15.000
35	13	65	19.500
30	17	85	25.500
25	20	100	30.000

50	5 — 1/2
45	7.5 — 3/4
40	10 — 1 1/2
35	12.5
30	15.0
25	17.5

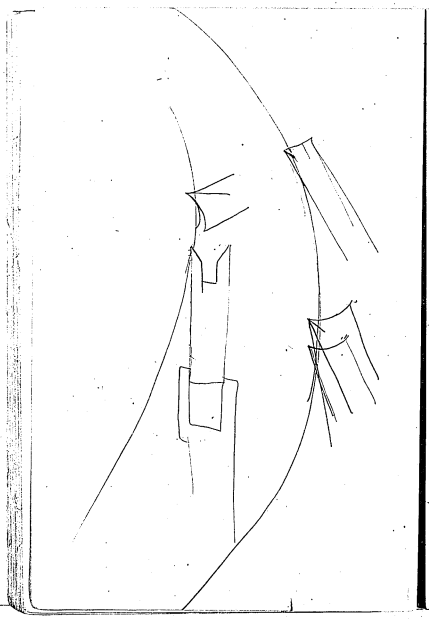


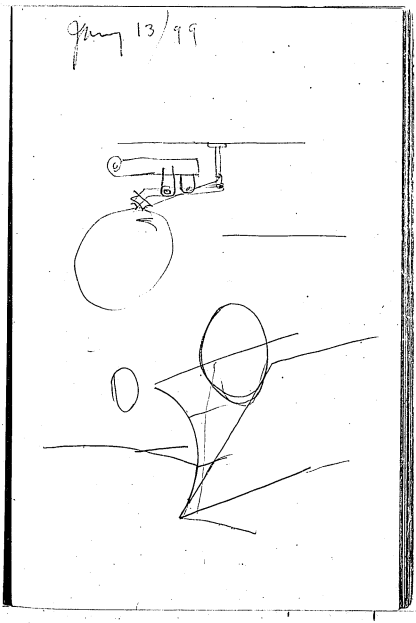


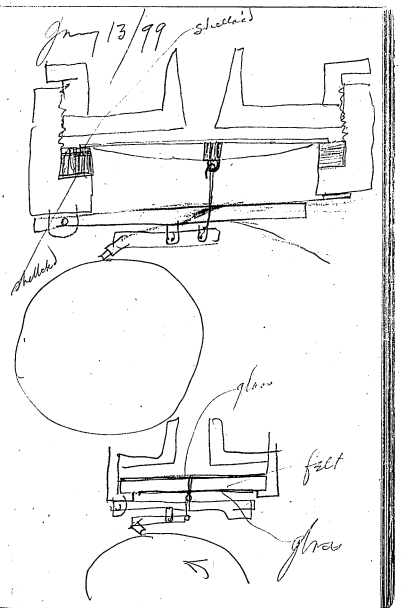




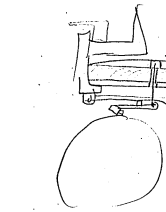
9 luni 11/99




13/99


shellac
glass
first
glass

Jan 13/99

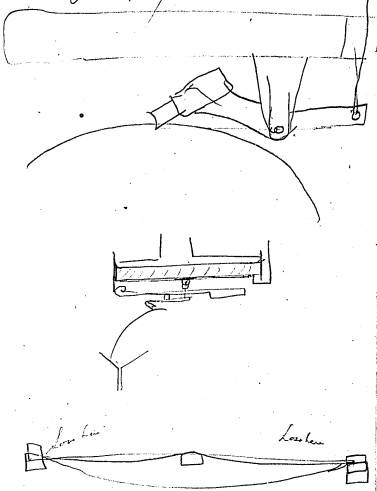


Loosefill
also Foam
also Cotton batting

Second layer Velvet
Tetto Canton flannel

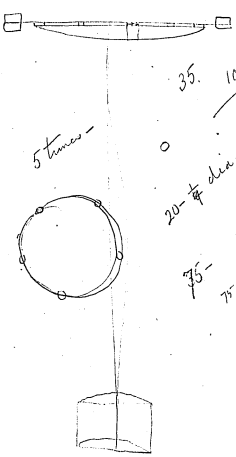
1/2" Thick
or more

Jan 13/99



Low Low

Low Low



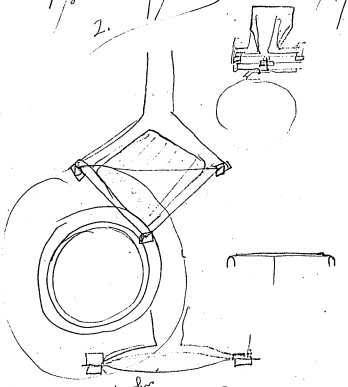
35. 1000 ohms

5 times -

20- ¼ dia - ¼ long

75- 125 3 15

75 / 3.75 5



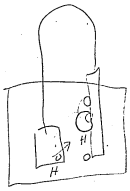
1½ - 9½ out Jan 14/99

2.

6 7/100 ohm

1/1000 Volt -

7/100 - 340 -



225–

225.

450 1 hour

7 deg minute

.07	.07	Milamp 2000
.14	.14	1000
.28	.28	500
.56	.56	250
1.12	1.12	125
2.24	2.24	62
4.48	4.48	31
8.96	8.96	16
17.92	17.92	8

1/14/99

1 volt 1000 – . 1 milamp
1/3.3 milamp

1 mely 8 hours

4 amp

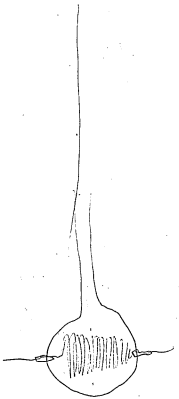
150 | 250 | 125 mely

50 | 50 | 40 hour

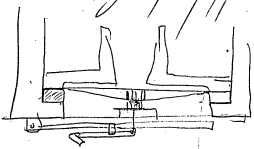
55 hours 2 grams | 11

100 hours 1 hour

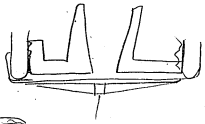
12 mely = 2.36
118 8

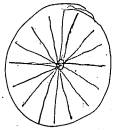


June 14/99



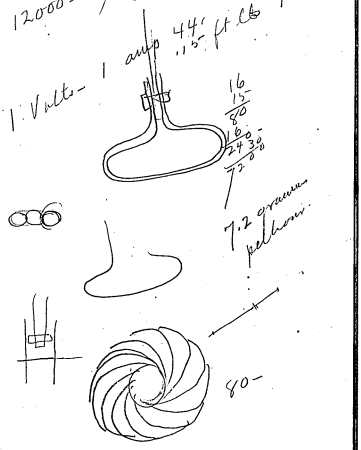
Silk, Ruby
Lined to
Clasps
to





12000 – 3/24000 – 1/8000

1 Volt – 1 amp 44 ft lb 7200 grm



short

373/760

7.746

671.4

746

225 35 125 675 1875 14 5-6 14 19 6

217

746 – 9

14.775 1475 7375 1025 225 1800

975 475 4875 6825 8775 95062.5

1030 590 1775 217.562.5

5 " 100 50% 400

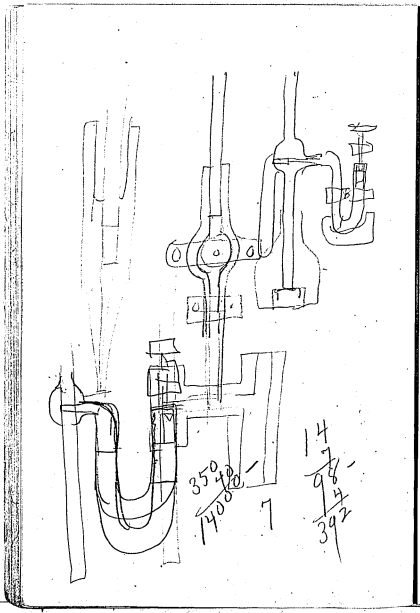
8 units in 225 3.6%

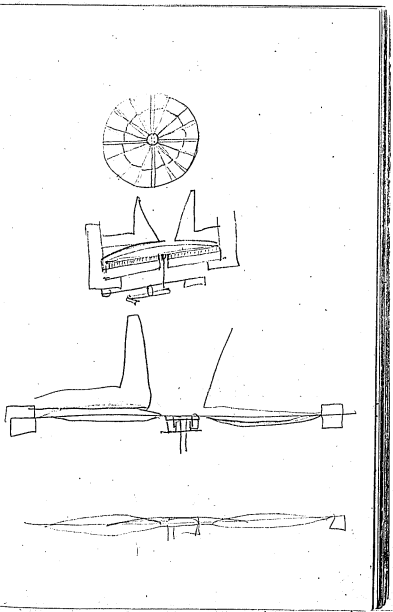
10 units in 400 2½% 1975

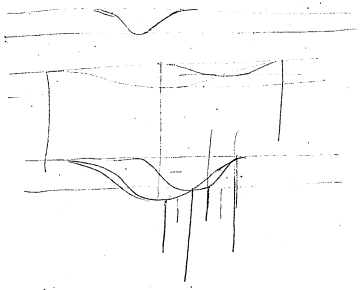
1975 9875 10 units

100 0

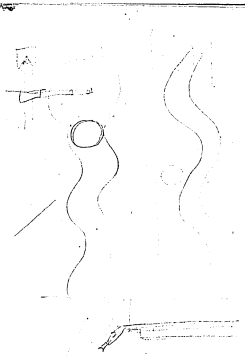
1382.5 1775 1975 3900.625


350
140
7
14
98
392

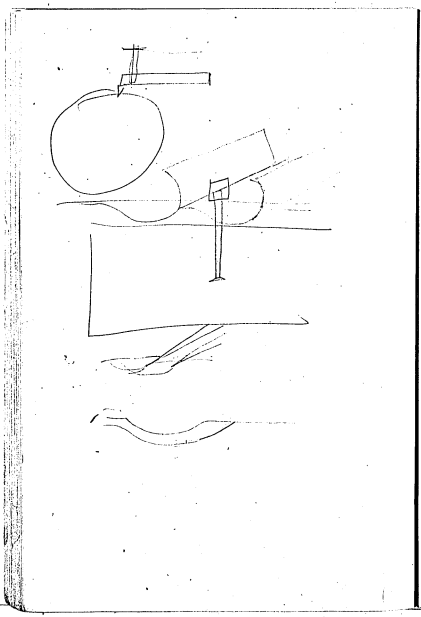


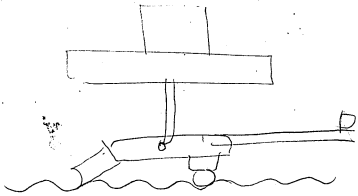


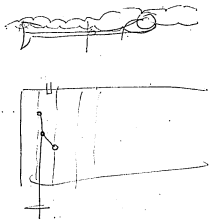
9.4
5 2

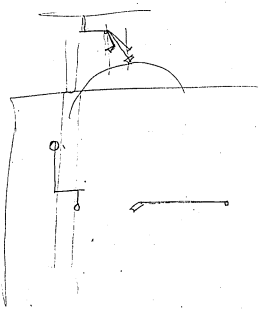


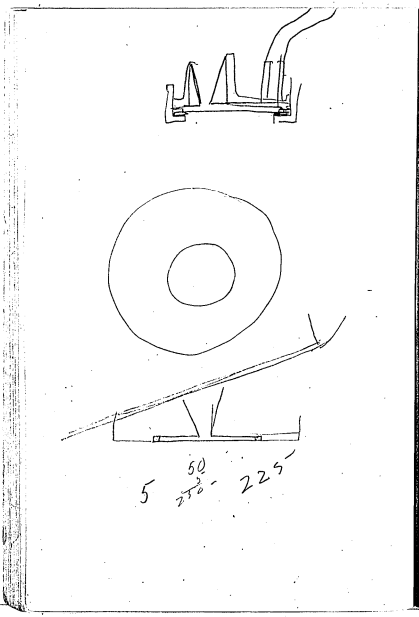
75 2.5) 750.3
62
13
450

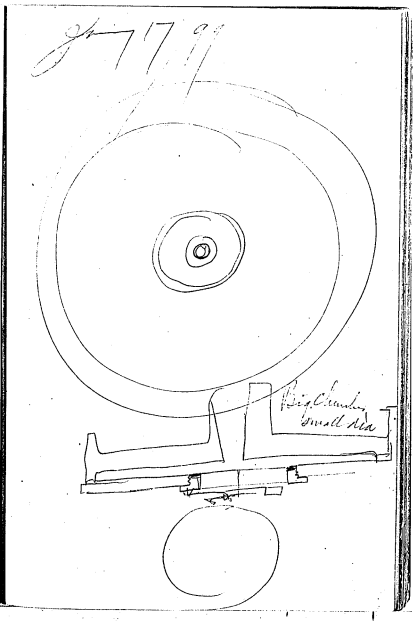




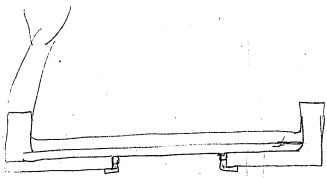


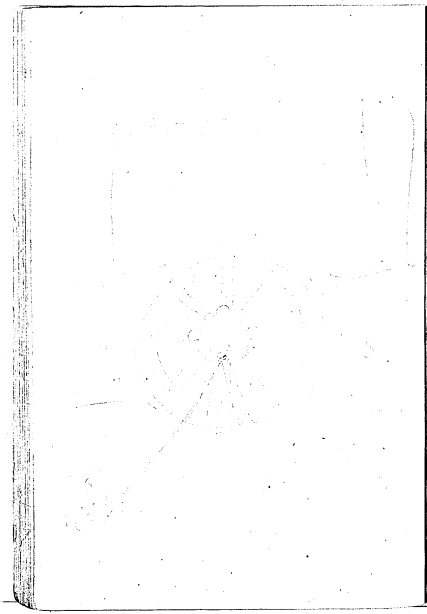



5
50
270
225


Big Crank
Small Ada

7/7 99

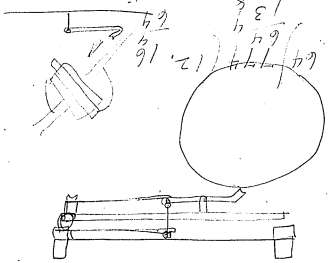




Dammar
Ceresin
~~Paraffin~~
Beeswax
Japan Wax
Sterate Magnesia

Sterate Magnesia base—
Ceresin
Beeswax
Japan Wax
Paraffin

Ceresin
Beeswax
Japan Wax



PbO_2 — 200 / 32 / 232 / 320 / 232 / 88 (10

CO_2

23. $NaNO_3$ .031 .05

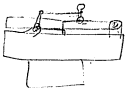
232 / 1.4 / 928 / 232 / 32,448. / 1.02 14½ —

1 lb PbO_2 09

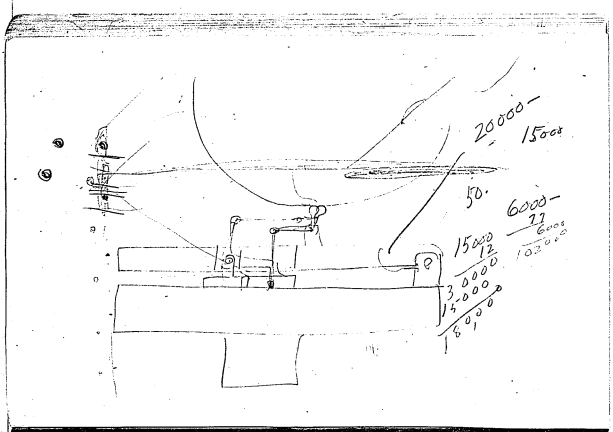
Makes – 3 oz O_2 at 2800 temp

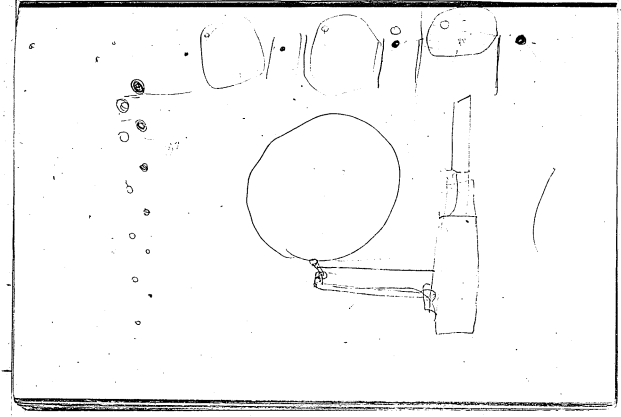
Hence – 5 times bulk of air

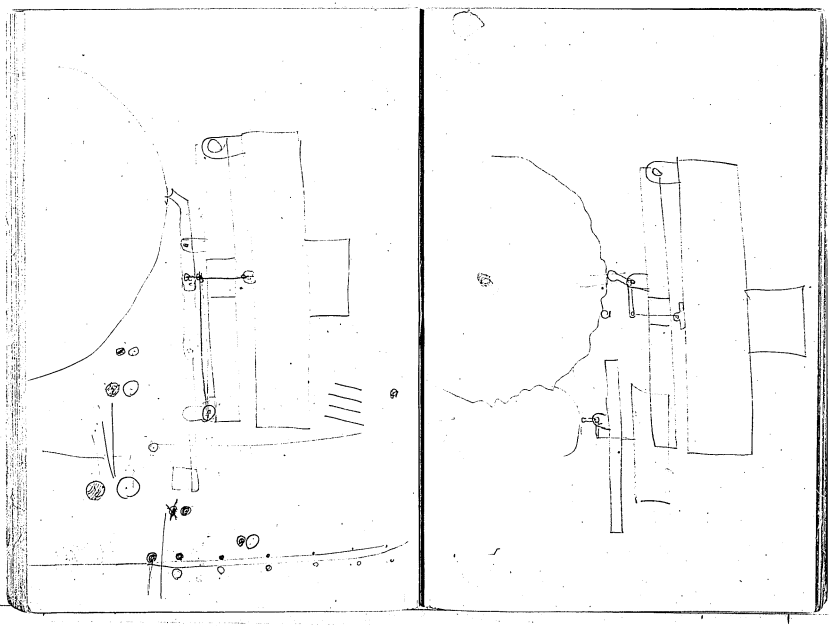
232 29 44 23.

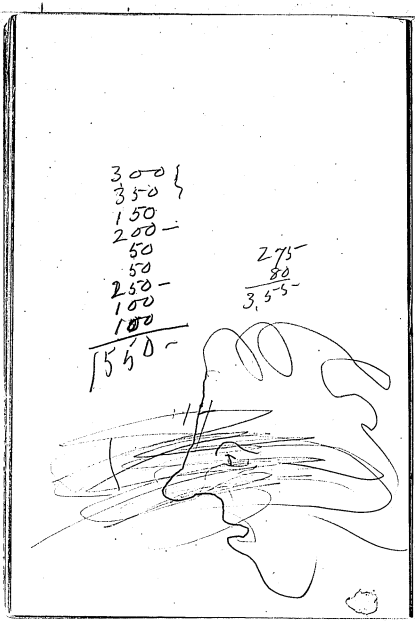


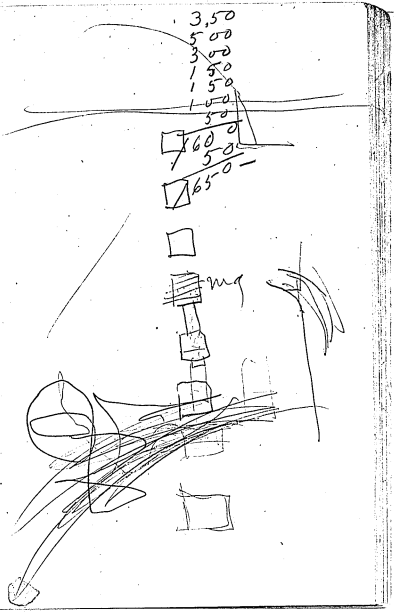
1 lb PbO_2 will burn – 1 oz charcoal — or 16 lbs – 1 lb. $NaNO_3$ – 2½ lbs – 20

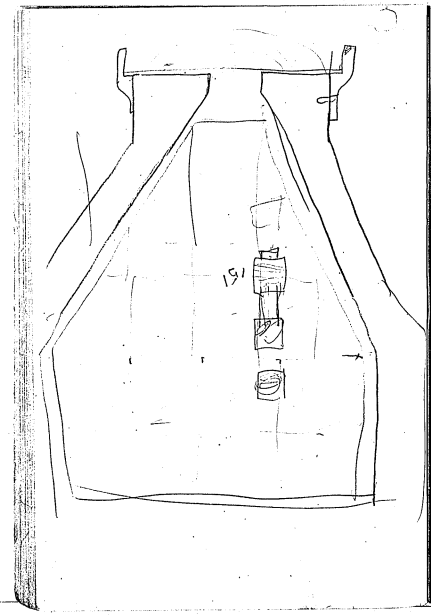

20000-
15000
50.
6000-
15000
12
3000
15000
6000
12
6000
102000






3 0 0
3 5 0
1 5 0
2 0 0
5 0
5 0
2 5 0
1 0 0
1 0 0
1 5 5 0
2 7 5
8 0
3, 5 5 -


3,5 0
5 0 0
3 0 0
1 5 0
1 5 0
1 0 0
5 0
1 6 0 0
5 0 0
1 6 5 0
mg



4-115 5

Dumbbells Cam segments
Swordfish one perfect
66 new 30 phosphors

64 5000/Lbs —

3 · 78/26

1 sqr inch second is 1 Column 60 lbs low

70 1 sq inch —

60 — down

14 50

13 | 100 (4666

4666 Lbs water —

10 HP

10

2 ft. 26 ft long

25 | 1726

1200

480

640

8 Sq Inches

350

212

1000000

1666 1/3

14000 | 240000 (171 —

150 | 2240 (15.

150 2175/5 22 00

10C 22

5000 Cubic ft at 350 —

Reduce to 212

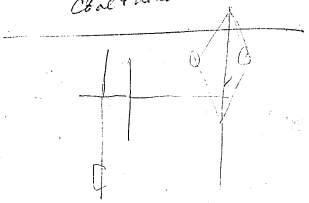
2 Am 26 ft long

Wt Girder 1600 Lbs

Total 6600 Lbs —

to equal - 500 Lbs of

Coal & Ladder —



Saving Reduce temp
Clinker to 1000 + use heat

900 000

Reduce Radiation To
250 150 000 HU

Exit gases reduce
300 deg at 4000 HU per deg

1 200 000
2 350 000

With ash 184 lbs coal
out of 1200 with ash —

14000 / 2 350 000 (168 lbs
1 400 00
950 00
840 000
112 000
16
184

184
285
469

150
120

5000
600
3 000 000

2 193 000
15 409
2 178 591 (4340
347 102 000
2 160 000
18 591
16 200
2 391

1200
469
8 / 7731 540
91 60

50 33 1000 (33.

8 / 376
47

14000 / 4 000 000 (285
8 800 0
1 200 00
1 120 00
80 000

4340
300
1 302 000

14000 / 2 400 000 (171
1 400 00
1 000 00
980 00
20

547
171
376

Expulsion of
CO_2 from 4300 Limestone, 4 440 000 BTU
1 512 050 BTU
2 688 000 BTU

3200 lbs Clinker (1900 Coal)
Equals 800 lbs H_2O
2000 deg 1,600 000 BTU

Radiation at 350 deg
380 BTU per 5/10 sq ft
1,038000. BTU

Heat in 1120 lbs CO_2
from Limestone. 550 deg
154 000 BTU

Heat of clinkering assumed 1,500,000

Decomp of Water -
2½ lbs Hydrogen - 34500 HU
85,000 HU

Velocity 4)1120
280
4)1400
350 122 ft min

800
2000
1,600,000

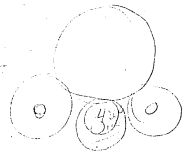
28½ lbs Coal, 600,000
saved for every 100
deg of gases 19-
deg saved

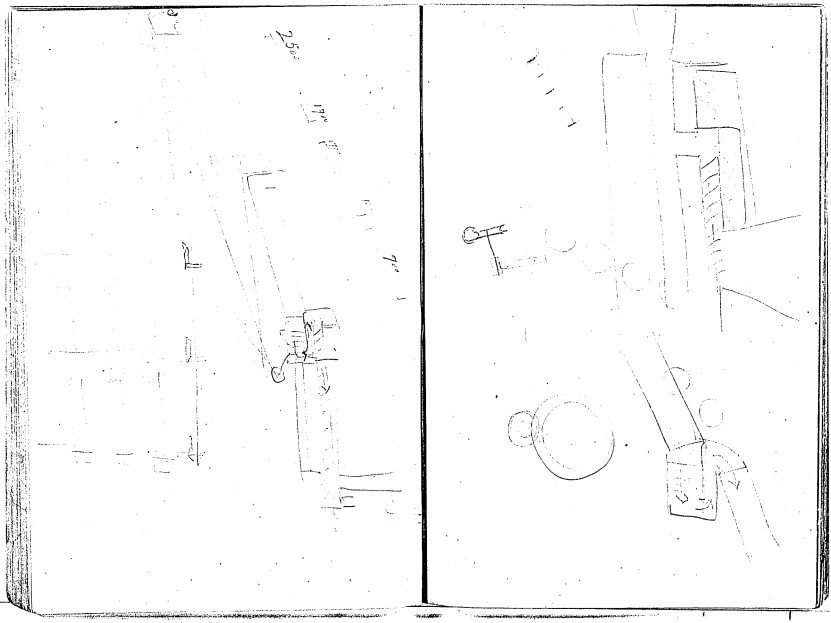
21193 000
1 512 000
1 600 000
1 038 000
154 000
80 000
85 000
8082 000

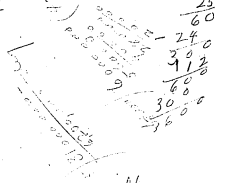
8,082,000.
2,900.
4)3200 109 82

25-
34000
100 000
85-000 000

4000
300
1219,000







ft

Big pieces 13124 - 9 to 1 360 lbs
CP ring girth - 4000 6 to 1 170 "
Under big pieces 3200 - 9 to 1 90 "
arch No 1 sill ft. - 6000 6 to 1 250 "
206 lbs - 40000 ft stone bridge 50
Turrets 2' thick
Battlements 12000 ft - 9 to 1 335 lbs
6 to 1 / 3850 lbs 93000 ft 7 rows floors
206 Columns stone - 20000 ft
500 lbs
6400 ft wall around 50 ft 1 960 lbs

35
25
175
70
875
437 5
6125
656 25

262

75
60
4500

2000

35
75
175
245
2625
1

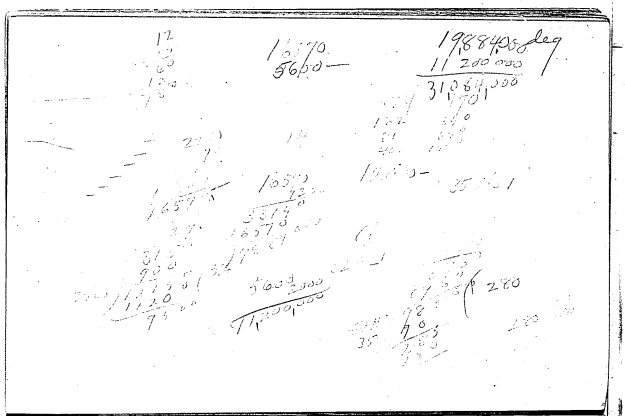
6562
3/2 80
93 / 3124
2

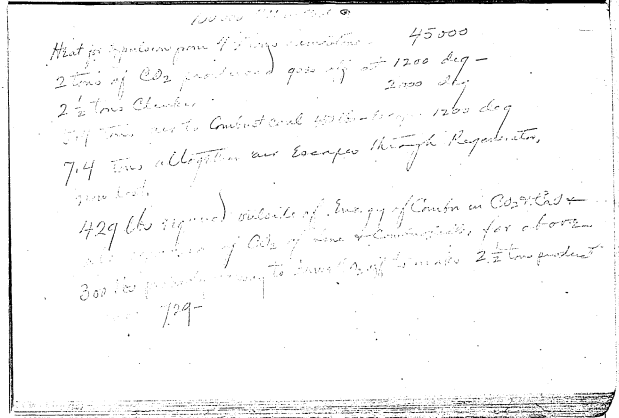
12000

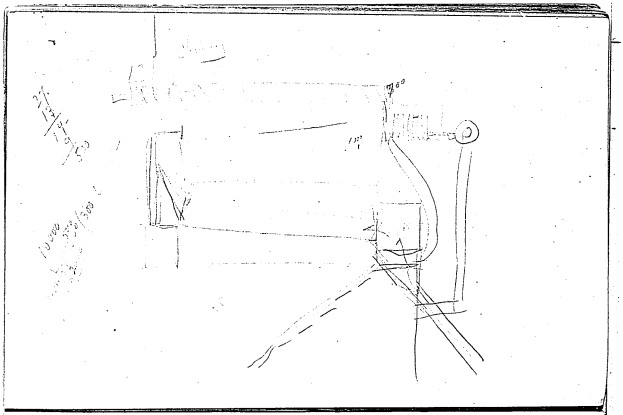
16 46 350
5 12
80 700
100 350 00
2000 42

12

1000
20
20000




45000
2 times of CO_2
2 1/2 times Chamber
7.4 times
429 lb
300 lb



1050 - shell
150 burners
150 inflatable
460 blower
200 Regenerator
125 in furnace
60 stack
150 Control furnace

Kiln burning 866 lbs Cement of
400 Lbs per bbl per hour —
60 ft long 6 ft dia —
Exit gases 600 deg
" Clinker 2000 deg
Limestone used 4320 Lbs
CO_2 in the Limestone 1120 Lbs
17 Lbs free air per Lb of
Carbon

BTU—	C to CO_2	96000
	CaO to CaO_3	42500
	H. To H_2O	24000.

~~Used 1000 less than above~~

Cylinder of furnace 1640 ft
radiating surface
assumed temp 307 deg
357 BTU per 16/10 of foot
lost per hour when at above
temp — at 350 8% additional
+ 8% for every 50 deg added

Present Consumption per bbl of
Portland Cement 150 Lbs.
Carbon 10% ash 135 Lbs Carbon

BTU in Lbs of Combustible + 1000 less
than gram deg units —

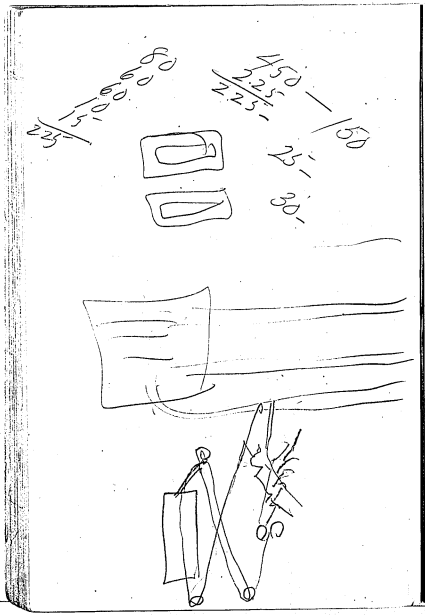
Heat of Combustion 13565 C 12960 — 96C

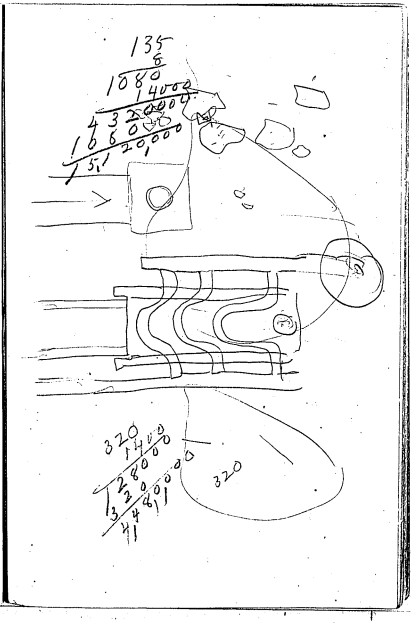
15120000 BTU- 103,680

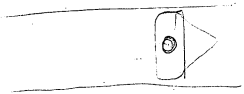
Air used 18360 Lbs
Which exits with Carbon 19940 Lbs at
600 deg take assuming
Equals 4985 Lbs water

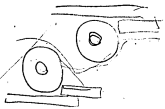
~~7491000 BTU~~
21193000 BTU-
above the atmos
or 540 deg

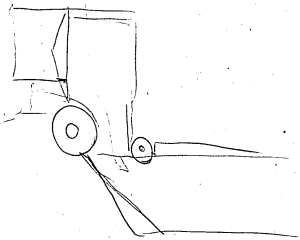
21930000
15400000
2.3370000

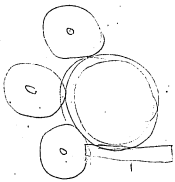


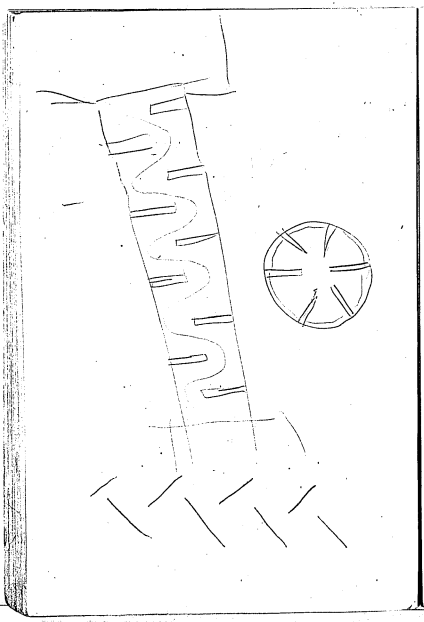












6858) 10368000 (1511
6858
35100
34290
8100
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12420
6858
5562
4000) 96000 (6000
84000
12000
11800
135
17
945
135
2295
1836
135
96
810
1215
1296
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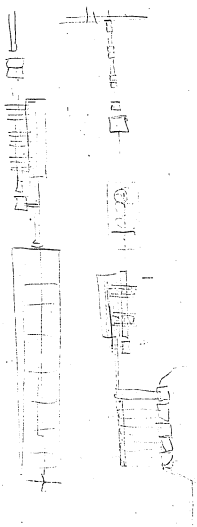
135
1080
18360
10800
1944
19940
4985
6000
4991000
4985
4400
19940
19940
3.1934000



1400 | 400 000 (2815
2800
12000
11200
8000

192 | 4000
768
1320
1152
1680
1536
1440
4000 Hll per degrais...

31

700 | 400 000
800 | 600 000
900 | 1 200 000
1000 | 1 600 000
1100 | 2 000 000

(3986

550 | 2 193 000
1650
5500
5445
5500
4400
4

3200
1920

Storage - building 20,000.

Engine & boilers 14,000
Main shaft & pulleys 4,000

Elec light - 3,000

Orlop plain & heating - 5,000

Offices 2,000

Laboratory 3,500

Cars ~~steam~~ 10,000

Drills Compressor etc 3,500

65,000

42,000

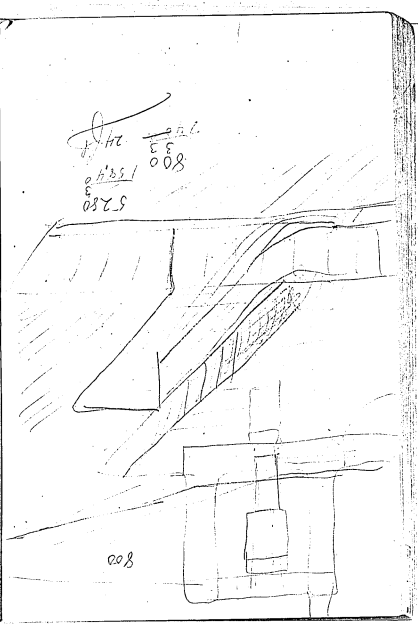
95,000

10,000

shop 212,000

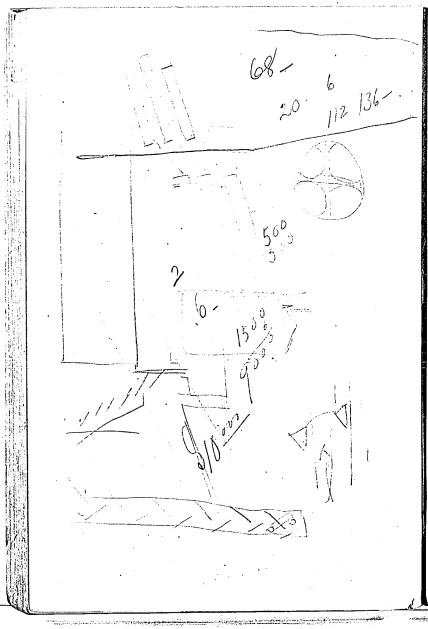
25
5,300
125,000

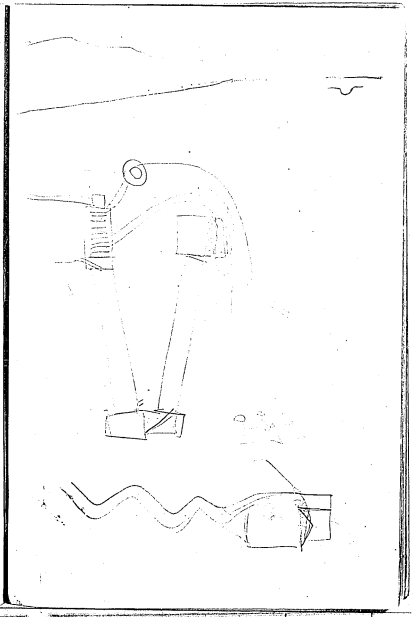
1,269,911
22,500
5,250
2,700
20,000
135,

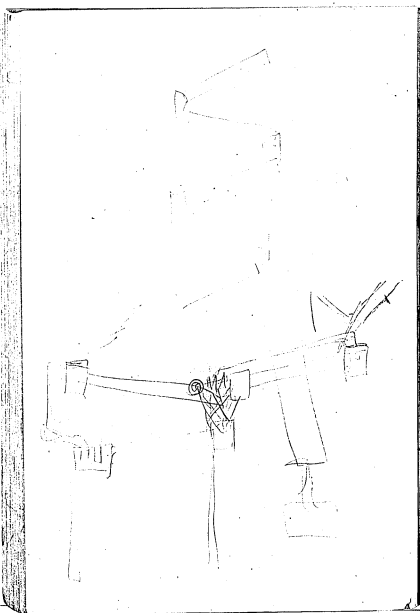


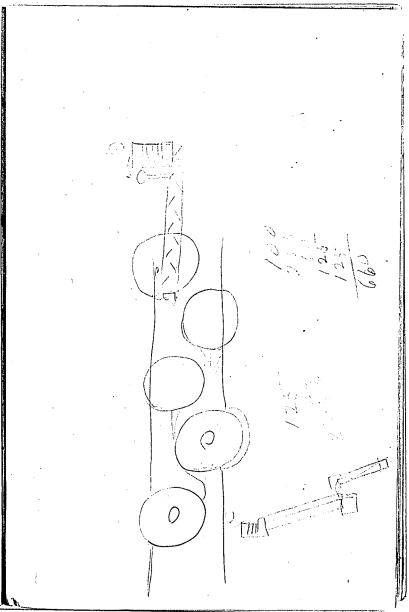
1st 36	3	
Hopper -	500	
Track	1000	
Rollerfeed	300	
Hopper now 1st 36	150	
Chutes to 2nd 36	100	
2nd 36 -	3000	
Rollerfeed -	150	
Chute to 3rd 36	100	
3rd 36 -	3300	
Platers for above		
3 Rollers nuts etc	750	
Boring Lathes for platers -	2000	
Jackshaft - pulleys	1500	
Elevator -1	1800	
	6000	
Dryer	1000	
Sjucks		
Belt to Stocks	1000	
House	5000	
Stock house	15000	
Crushing House.	15000	
Erecting -		
	42650	

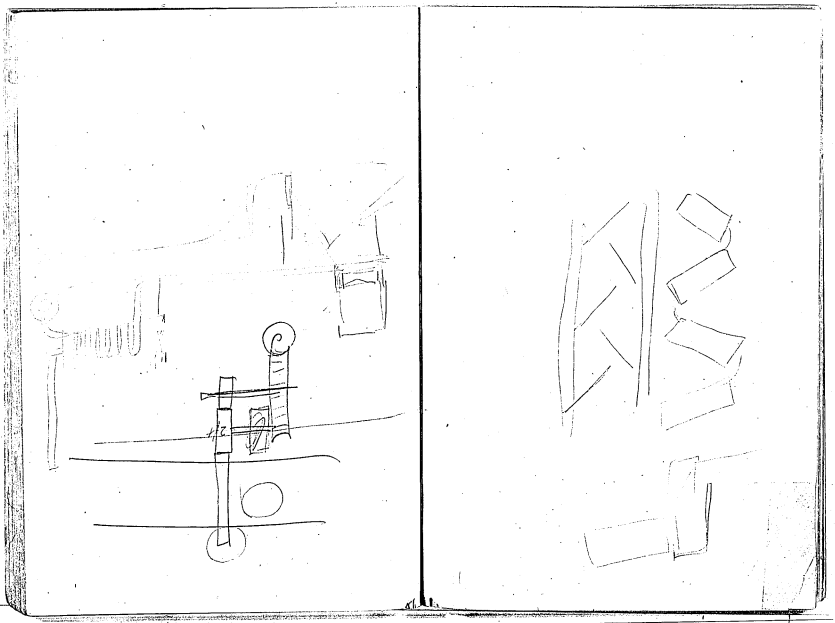
Limestone crusher plant -		
2 3 Highs -	5000	
Screens -	1500	
Elevators -	1500	
Scraper	500	42650
Conveyor -	600	95300
Conveyor to burners	6000	65000
Scraper over "	1200	202950
12 Cylinders - Furnaces stacks & Regenerators -	30000	
Building -	15000	
Shafting etc	2000	
Erecting	8000	
Cement Mill -		
Building	15000	
Big Rolls -	3000	
3 3 Highs -	6000	
Conveyors to silos	800	
Elevator	1500	
Scraper	600	
Conveyors to stores	1500	
Screens	2000	
	95300	


68
20
6
112
136
2
6
5
3
15
9









You will, I am sure, have noticed
me to say a few words over the
telephone on this occasion because
he knows that I have a
decided prejudice in favor
of that Institution
that he is in general of—
& that I am a
great believer in the methods
by teaching followed by
that institution, for the
reasons that for nearly 4 years
I was had associated with
me many young men from various
institutes of Learning, and I
can truly say that for
High Technique from Accuracy
practical utility and immediate
availability I found Equal
the men from the
of hope you have a pleasant journey
with your
Yours

HU 135C 150 lbs Coal per Bbl. Clk

15 720 000 BHU

Heat in Exit gases
540 Cubic Feet 60 deg.

2.347 000 BHU

Expulsion of CO_2 from 1900 lbs of CaO 2.688 000

Reduction from Cylinder 350 deg 1.038 000

Heat of Clinkering assumed 1.500 000

Temp K_2O 2½ lbs H. 85 000

7.658.000

14000 / 7.658.000, (547

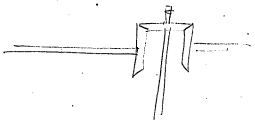
0000

6 5 8 0 0 0

5 6 0 0 0 0

9 8 0 0 0

1 9 8

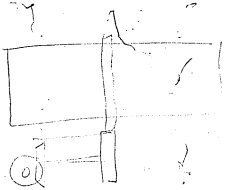


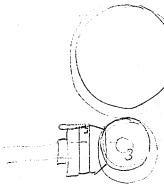
8ft-

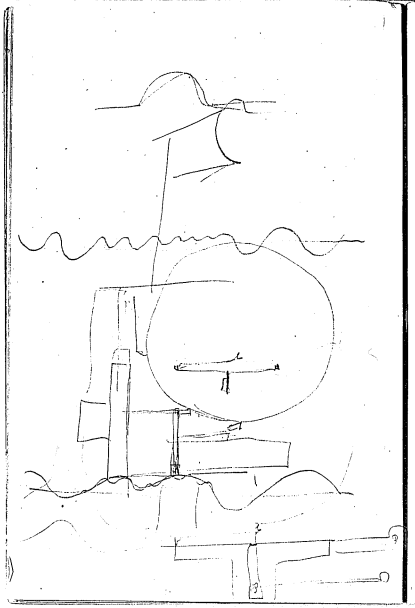
5

24

10-







Motor driven

objections –

1 worm gearing + ~~a~~ the higher gearing on account of high speed of motor –

2 20 motors –

3rd Expenses of 20 motors

4 Complication + liability get out of order

5 Starting boxes for all leading to Expenses + Complication

6 Wear of Expensive Commutator + brushes + high speed bearings

7 Loss of efficiency in many motors instead of one

Advantages

No stress in gearing at starting – C

Capability of exceeding in blustery weather

Gears on cooling cylinders –

Single shaft –

Consisting of one shaft 500 ft long with worms every 25 ft worm wheel Spur pinion 9 teeth & Spur gear on cylinder – speed of shaft 200

of " 2 – shaft could be driven by one motor – 250 ft each way

Objections

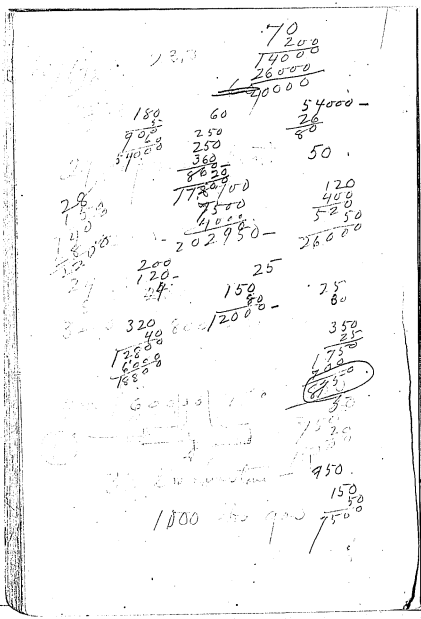
1st Shaft very long
2 25 worms & worm wheels –
3 necessity of 25 oil bearings.
4 Stress by sudden starting
5 Expense of worms &c –
6 Necessity of 4 inch shaft in size & bevel & worm –

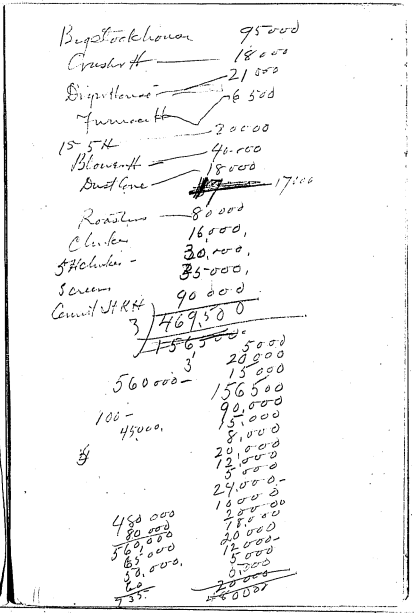
Advantages

One motor with high Efficiency

Extra stress in starting

Small Expense & little Complication




Bagstacker Conveyor 95-000
Crusher H 18 000
21 000
Digestioner 6 500
Trommel H 200 000
15 5 H 46-000
Blower H 18 000
Dust Cone 17 100
Rotation 80 000
Cleaner 16 500,
5 H Cleaner - 30 000,
Screen 35-000,
Cement JH RH 90 000
469 500
156 500
560 000 -
45000.
480 000
80 000
560 000
63 000
40 000
20 000
735.

Refeed	5
1st 36	~~15~~
2	20
3	35
Elev	15
Shaker	3
Blowers fan	3
Extractor	10
Elev 2	10
Brit	8
Shaft	15
"	8
Extra	20
	167

Belt under stock	5
23 High	100
belt under	5
Elev	15
Scraper	10
Shaft	20
	~~155~~

Clinker

Roll	25
Scraper	10
23 High	150
belt under	5
Elev	15
Scrap	10
Shaft	20
belt to stk	25
	260

8 Roasters	90
Blowers	25
Scraper + Elev	12
Coal crusher + Engine	20
Shaft + worm	40
Big blower	20
	207

167
155
260
207
789

25
900
225 100
20

225
20
45 0

5 lbs Material
10 lbs water
2 lbs Soda
7 lbs cell-
24 Cellosan
9 lbs preservatives

11 | 75 (7

18 (11
60

67
23
310
124 0
155 1

1728 (28
12 4
486

28 | 336 (12
28
56

18000 ft lbs -

1650 | 18000 (10
15 50
1500

20 | 33 qua 0 (1650
20
130
120
100
100

3 10 hours

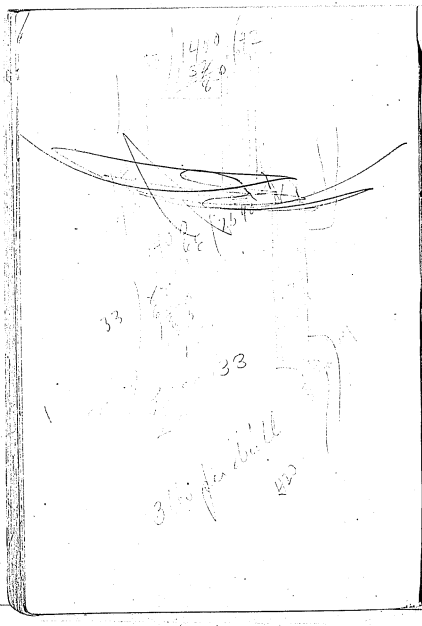
50 Cents hour

12

36
83
2986

155 | 1728 (11
155
17

28
12
56
28
336



1 lb Coal heat 40 lbs water
up from 60 to 200,
or 160 lbs. or 2000 cub ft air
or for 1 min. 33 cub ft per min.

1 lb. ash at 80 [illegible]

4 " Quer [illegible]

1 lb charcoal heat 4

800 -

200 -

160
3
480
160
2080

50 Mill Men
25 Mine
5 Loco
75 other
155

35
140
140
350
4900

4 helper
10 Mech
6 Boys

2500
5
6
30
3
3
3
3
10
10

175
26
1050
350
4550

CP 2500

Mills 35 men
Oil 1
1 Shovel - 460
500
125
125
1210 — 1250

Drillers 450
2 pumps 2000
125
1075 — 250

Mill 1 -

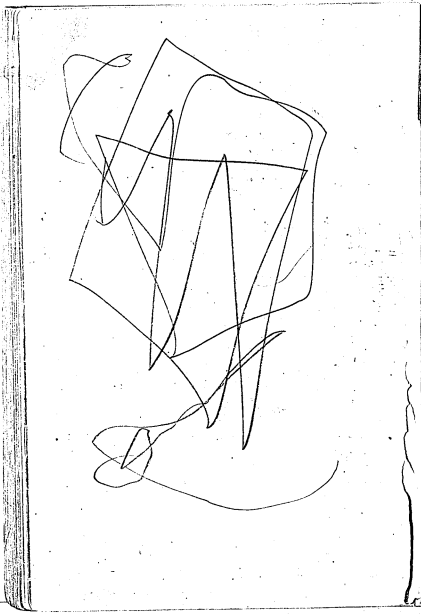
300
125
230
240
875
140
125
125
150
115
125
125
2175
145
2930

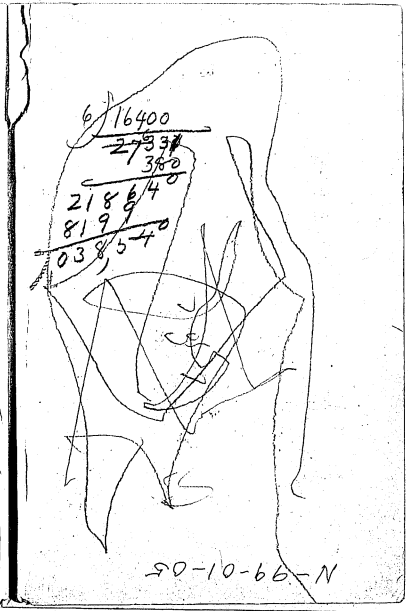
5 $330
30
24

12
10
22

11
5
55
6
330

25
6
150
6
900




6 16400
2 7 3 3
3 6 0
2 1 8 6 4
8 1 9
0 3 8 5 4 0
90-10-66-N